the panicles of the *Byblus-rush*, in order to record this interesting fact in connexion with so important an African plant as the *Papyrus* or *Byblus*, I should prefer to call this new Antelope *Tragelaphus byblophagus* instead of "*T. Spekii*," the name suggested by Dr. P. L. Sclater. Another character of this animal is very worthy of note—namely, the extreme length of the *toes* or fore parts of the hoofs, so that "it could hardly walk on the dry ground," but of course most useful for traversing the mud and marshy shores of the lakes. This provision of nature reminds me of the *long toes* of the Water-rail, Gallinule, and other kinds of the family Macrodactyli of Cuvier, which he characterizes as having "les doigts des pieds fort longs et propres à marcher sur les herbes des marais;" and in like manner, it adapts that Antelope to walking over, and being supported upon, the long stems of the *Byblus-rush* and other fluviatile "plants so densely interwoven in the waters"—or, in the exact words of the philosopher Seneca (Nat. Quæst. lib. vi. cap. 8), "ita implicitæ aquis herbæ"—not only of the Upper Nile itself, but also of the reservoir-lakes which feed that mighty and sacred river.

Feb. 19, 1864.

XXIX.—*Observations on Raphides and other Crystals.* By George Gulliver, F.R.S.

[Continued from p. 215.]

Smilaceæ.—The following officinal drugs were obtained from the authentic dispensary of the Society of Apothecaries, through the courtesy of its worthy treasurer, Mr. Ward:—Red Jamaica Sarza, Honduras Sarza, Guatemala Sarza, and solid extract of Sarza. All the three roots abounded in raphides, generally seen within oblong cells, which, in the Guatemala specimen, often appeared as beautiful chains along the liber. This sample was remarkable for the scantiness of its starch, scarcely a trace of which could be detected; while the Red Jamaica and Honduras abounded in starch-granules and their cells. In the extract no raphides could be found; but it contained numerous quadratic octahedrons, about $\frac{1}{2900}$th of an inch in diameter, and exactly resembling those microscopic crystals which have been usually regarded as composed of oxalate of lime. These crystals are most easily found by diluting the extract with water, and then letting them subside to the bottom for collection. The examination of the officinal American sort will be found noted under Araliaceæ.

Dioscoreaceæ.—In all the few species yet examined we have

seen the abundance of raphides. And they are plentiful in the root, stem, leaves, and decayed flowers of *Testudinaria elephantipes*.

Trilliaceæ.—Fresh and dried plants of *Paris quadrifolia*: bundles of raphides plentiful in leaves, sepals and petals, anthers and filaments, testa and berry-coat. Unexpanded flower of *Trillium grandiflorum*: raphides scanty in ovule, but bundles of them very numerous in ovary, styles, stamens, corolla, calyx, and flower-stalk.

Zingiberaceæ.—Fresh leaves of *Amomum* (*A. cinnamomum*?) and of *Hedychium Gardnerianum*; and dried Cardamoms of the shops: no raphides; only a few minute lozenge crystals, like those of Aurantiaceæ, in the leaves and dried capsules.

Marantaceæ.—Leaves of *Canna Indica* and *C. iridiflora*: a few of the lozenge crystals, but no raphides.

Iridaceæ.—To the plants before mentioned ('Annals,' Sept. 1863) may be added *Gladiolus insignis* and *Iris pumila* as affording excellent examples of the crystal prisms. Most of these crystals have four, and a few three, angles; their average length is $\frac{1}{50}$th and their thickness $\frac{1}{800}$th of an inch; they abound in the leaves of both species, and were seen in the roots of *Iris pumila*.

Amaryllidaceæ.—*Clivia nobilis*: raphides abundant and very small near the base of the leaf, but very scarce in it elsewhere. *Narcissus poeticus, N. biflorus*, and the garden Jonquil or Campernelle: leaves, bulbs, and roots abounding in raphides.

Liliaceæ.—Leaves of *Dracæna terminalis, Muscari*, sp., *Tritoma Uvaria*, and *T. media*: numerous raphides and larger crystal prisms. Leaves of *Lachenalia tricolor, L. pendula*, and *Asphodelus luteus*: raphides plentiful. Of the species of *Allium*, though I have examined several once and others repeatedly (viz. *A. Ascalonicum, A. Cepa, A. Porrum, A. sativum, A. Schœnoprasum, A. angulosum, A. magicum, A. Moly*, and *A. ursinum*), true raphides were not found in any one of these plants; but a section of the genus, as observed in the above first four species, is characterized by an abundance of crystals in the bulb-scales—right-angled four-sided prisms, the ends either obtusely truncated or with very low four-sided pyramids; mostly occurring singly, sometimes two, three, or four stuck together, occasionally forming crosses; always (unlike true raphides) difficult to detach from each other and from the tissue in which they are imbedded; commonly about $\frac{1}{200}$th of an inch long and $\frac{1}{800}$th thick; well seen in the peel of the officinal Shallot, in which they are very plentiful, and slightly larger than in the Onion, Garlic, and Leek.

Melanthaceæ.—In this order, also, some species are as con-

stantly abundant raphis-bearers as others are not so. *Veratrum nigrum* and *V. album* (roots and young leaf-buds): numerous bundles of raphides in delicate hyaline cells; in the leaves also a sphæraphid tissue, each of the sphæraphides about $\frac{1}{600}$th and its cell $\frac{1}{200}$th of an inch in diameter. *Helonias bullata* (leaf): raphides very scanty. *Colchicum autumnale* and *Bulbocodium vernum*: leaves and bulbs destitute of raphides; but numerous faint and minute raphis-like objects, about $\frac{1}{1000}$th of an inch long and $\frac{1}{2400}$th thick, in roots; no crystals in bulb-scales. *Tofieldia palustris* and *T. pubescens*: no raphides in leaves or roots.

Commelinaceæ.—Raphides abundant in the leaves of *Tradescantia Virginica.*

Butomaceæ.—Roots and subterranean buds of *Butomus umbellatus*: no raphides; tubers made up chiefly of starch, and their pulp ropy and immiscible with water.

Araliaceæ.—Subterranean stems known as wild or American Sarza (*Aralia nudicaulis*), obtained from Messrs. Butler and M'Culloch: was plentifully studded in the liber and pith with sphæraphides, averaging $\frac{1}{400}$th of an inch in diameter; but neither starch nor raphides were seen. *Hedera Helix*: no raphides.

Aurantiaceæ.—I have seen no raphides in this order; but it abounds in crystals about $\frac{1}{1000}$th of an inch long and $\frac{1}{2777}$th broad, as may be well seen in the leaves and petioles of *Citrus vulgaris, C. decumana, C. Aurantium,* and *C. myrtifolia*; the crystals sometimes nearly square, but commonly lozenge-shaped, single or double octahedrons, and more rarely twin-formed, like the crystals which have been described in many other plants as sulphate of lime.

To Mr. Ward, Mr. De Carle Sowerby, Mr. Cox, and Mr. W. H. Baxter I am indebted for generous aid in the prosecution of the observations in this paper. The results will be examined when a survey is made of the whole series. Meanwhile it may be noted that this portion shows different species of one order (as *Allium* and *Muscari*) growing close together in the very same soil of my garden, and yet the former plant as constantly devoid of raphides as the latter is pregnant with them—the first three orders of Monocotyledones abounding in raphides, which suddenly disappear in the fourth order (Hydrocharidaceæ) to reappear in the next succeeding one; and the equally curious difference in sections of Melanthaceæ—*Veratrum* with its swarms of raphides, and their deficiency in *Colchicum, Bulbocodium,* and *Tofieldia.* Surely such facts are sufficient to show what a vast and interesting field of plant-life lies barren to us from want of

cultivation; the improvement of which, with the aid of the chemist, might be expected to afford important results for botany and physiology.

Edenbridge, March 8, 1864.

[To be continued.]

XXX. — *A Description of, and Remarks upon, some Fossil Corals from Sinde.* By P. Martin Duncan, M.B. Lond., F.G.S. &c.

[Plates XVIII. & XIX.]

It must be evident to all who have studied the distribution of the Corals of the Secondary and Tertiary formations, that the Eocene Coral-Fauna is very poor in genera, and that it is much less important than those of the lower Cretaceous and the Miocene strata. The comparative scarcity of Eocene Corals rendered M. J. Haime's description of seventeen species from the Nummulitic formation of Sinde of great interest, especially as several of them were well known in the French and Savoyard Nummulitic strata, and also because a new genus was added to the fauna*. Since the decease of this gifted naturalist, a part of the Blagrove Collection belonging to the Geological Society of London has remained undescribed†; and a very fine series of Corals from Kurrachee, in the British Museum, also. I was tempted to search for new forms, and found many more than I had anticipated; but all of them are not of Eocene age. MM. d'Archiac and J. Haime appear to ignore the Miocene in the great chain of hills which extends from the "Salt range" almost due south to Kurrachee; but the memoir written by Grant ‡, and illustrated by Sowerby, strongly advocates the existence of more than one Tertiary formation of marine origin. The discovery of three fossils from Kurrachee identical in species with common forms of the Nivajé shale of San Domingo leaves no doubt in my mind that several of the species about to be noticed ought to be separated from the Eocene Coral-fauna.

The following list embraces all the species as yet found in Sinde; and I have appended the other localities where they have been observed. The species which came under M. J. Haime's observation are also noticed.

* Descrip. des Anim. Foss. du Groupe Nummul. de l'Inde, par MM. d'Archiac et Jules Haime, 1853.

† See my note on the Sindian Fossil Corals, 'Quart. Journ. Geol. Soc.' vol. xx. 1864, p. 66.

‡ Trans. Geol. Soc. ser. 2. vol. v. 1837.